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TOBACYK'S PARANORMAL BELIEF SCALE AND TEMPORAL LOBE SIGNS: SEX DIFFERENCES IN THE EXPERIENCES OF EGO-ALIEN INTRUSIONS [1]

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Summary.—Tobacyk's Revised Paranormal Belief Scale and an inventory that infers temporal lobe signs were administered to 44 men and 54 women who were enrolled in first-year university courses. Women believed more in psi phenomena, witchcraft, and spiritualism than did men, who believed more in extraterrestrial life forms. Although complex partial epileptic-like signs were moderately (0.40) correlated with total beliefs for both sexes, these signs were dominated by experiences of ego-alien intrusions for women only. The results support the concept of greater interhemispheric coherence in women compared to men and emphasize the importance of limbic processes in the formation and maintenance of religious and paranormal beliefs.

Although a large portion of daily human behavior is determined by situation-specific reinforcement, interpretations of these events are heavily influenced by an individual's beliefs about the sense of self in the context of time and space (Persinger, 1987). Two interrelated domains are religious and paranormal beliefs; one appears to be a substitution for the other (Persinger & Makarec, 1990). Often the potency of beliefs is only evident in catastrophic situations that challenge the integrity of the sense of self within an uncertain future. Major events include the death of significant people, unexpected changes in economic and political climates, and alterations in lifestyle.

Religious and paranormal beliefs are infused with significant affect and often generate substantial frustrative aggression when they are refuted (Persinger, 1987); the public response of Islamic believers to Salman Rushdie's "The Satanic Verses" is a recent example. Such emotional intensity suggests a strong contribution of limbic input to the neurocognitive structures that mediate both beliefs and their more extreme variants: delusions. Bear (1979) has hypothesized that sensory-limbic hyperconnectionism facilitates the attribution of personal meaning to cognitive events; the consequence is most evident in subpopulations of temporal lobe epileptics.

There is now strong evidence that a continuum of temporal lobe lability may exist within the normal population (Persinger & Makarec, 1987). Normal people who display qualitatively similar phenomenology to that evoked surgically or spontaneously in complex partial epileptic patients also report

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more subjective paranormal experiences and endorse more exotic beliefs, such as extraterrestrial life forms and time travel (Persinger & Makarec, 1990).

The study of both the prevalence of and the neurocognitive contributions to beliefs is important because they influence problem solving (Persinger & Makarec, 1991a, 1991b), especially in personal decisions. For example, Stevens (1988) noted that belief in astrology as a predictor of behavior and as an explanation of events has been increasingly endorsed by older teenagers and young adults. The development of the Revised Paranormal Belief Scale (Tobacyk, 1985; Tobacyk & Shrader, 1991) and its application to a variety of populations (Tobacyk, Nagot, & Miller, 1988) allows documentation of the intensity and the distribution of these beliefs. This scale reflects seven domains of beliefs that are estimated by the relative strength of negative or positive endorsement along a 7-point scale.

The present study was designed to answer three questions. First, are the beliefs of a sample of predominately Roman Catholic (58%) university students in northern Ontario similar to a sample of university students from the southern (Louisiana) USA? Second, do phenomenological indicators of temporal lobe lability correlate positively with the intensity of beliefs? Third, do men and women differ with respect to the factors of temporal lobe signs that are most correlated with those beliefs?

University students from two first-year psychology evening courses served as subjects; their ages ranged between 18 and 60 (mean = 24) years; there were 44 men and 54 women. About 60% of the subjects were fully employed. In two settings, separated by one week, they were given the Personal Philosophy Inventory (PPI) and Tobacyk's Revised Paranormal Belief Scale (kindly supplied by the author). All data were loaded onto a VAX 4000 computer. Because there were no statistically significant differences between the two classes for any of the subscales of the Paranormal Belief Scale or the Personal Philosophy Inventory, the data for the two groups were combined.

Subclusters for the belief scale were established according to Tobacyk's designations. The following clusters of items were determined for the temporal-lobe relevant items of the Personal Philosophy Inventory for each student: (a) complex partial epileptic-like symptoms (CPES, $n = 16$ items) and the total temporal lobe scale ($n = 56$ items) and (b) Factor 1 (sensory enhancement), Factor 2 (affective-dissociation), Factor 3 (ego-alien intrusion), and Factor 4 (languaging). The first group is composed of clusters that were established theoretically while the second group was generated by factor analysis of the Personal Philosophy Inventory from 348 men and 540 women (Persinger & Makarec, in press). The control cluster (Persinger & Makarec, 1987; $n = 15$ items) was also determined.

Factor 1 was associated with items such as "There have been times when I have stared at an object and it appeared to become larger and larger." Two items that loaded strongly on the affective-dissociation factor were "Sometimes I can read another person's thoughts" and "People tell me that I become excited about insignificant events." The ego-alien intrusion factor contained items such as "I have heard an inner voice call my name" and "At least once in my life very late at night I have felt the presence of another being." Factor 4 included references to diaries and poetry.

Because previous analyses indicated that both beliefs and temporal lobe lability of men and women are determined by potentially different sources (Persinger, 1991), Pearson correlations between each of the Paranormal Belief subscales and the clusters and factors from the Personal Philosophy Inventory were completed for each gender separately. One-way analyses of variance between men and women were completed for each of the subscales and scales. Comparisons of means between Tobacyk's population and the present population (men and women combined) were completed manually; to minimize distortion, $n = 58$ (his sample size) was also assumed for the northern Ontario sample. The t-test scores were squared to obtain F ratios to facilitate comparison with other results.

The means and standard deviations for the components of the Revised Paranormal Belief Scale are shown in Table 1. Women reported more intense belief (all dfs = 1,96) in all paranormal domains ($F = 6.64$) and for the subscales of traditional religious ideas ($F = 4.82$), psi ($F = 10.13$), spiritualism ($F = 6.26$), and precognition ($F = 10.36$), while men reported more intense belief in extraterrestrial life forms ($F = 5.24$); there were no significant sex differences for belief in either superstition or witchcraft. Men did not differ from women with respect to the numbers of complex partial seizure-like signs

TABLE 1
MEANS AND STANDARD DEVIATIONS FOR DIFFERENT COMPONENTS OF TOBACYK'S REVISED PARANORMAL BELIEF SCALE

Scale	Men ($n = 44$)		Women ($n = 54$)		Tobacyk ($n = 58$)*	
	M	*SD*	*M*	*SD*	*M*	*SD*
Total	76	24	89	24	98	23
Subscales						
Traditional Religious	4.5	1.8	5.1	1.2	6.4	1.1
Psi	2.8	1.4	3.8	1.6	3.8	1.4
Witchcraft	2.6	1.3	3.1	1.8	3.8	1.8
Superstition	1.8	1.3	1.7	1.1	1.7	1.1
Spiritualism	2.5	1.3	3.3	1.6	3.3	1.4
ETs	3.5	1.2	2.9	1.3	3.6	1.2
Precognition	2.5	1.2	3.4	1.4	3.1	1.2

*Supplied by Jerome Tobacyk.

(grand mean 29; $SD = 18\%$) or the control cluster (77; 12%); the total temporal lobe signs score was mildly elevated ($p = .05$) for women (38; 13%) compared to that for men (33; 11%). [These group scores were comparable to those reported in previous studies, e.g., Persinger and Makarec (1987).] Although women displayed significantly greater endorsement than men for Factor 1 (36; 20% vs 23; 17%, respectively; $F = 11.40$) and Factor 4 (58; 29% vs 33; 28%, respectively; $F = 21.60$), there were no significant sex differences for Factor 2 (58; 21%) and Factor 3 (17; 20%).

The percentages of complex partial epileptic-like signs were significantly ($p < .01$) associated with the strength of paranormal beliefs for both women ($r = .39$) and men ($r = .41$) whereas the total temporal lobe sign score was correlated with paranormal beliefs for men ($r = .41$) only; the control cluster was not associated ($r < .10$) with either the paranormal belief score or any of its subscores. For women, beliefs in witchcraft (.37) and spiritualism (.43) were correlated with complex partial signs. Separate factor analyses for the seven Tobacyk subscales extracted only one factor for men and two factors for women; all subscales, except religious beliefs and superstition, loaded upon the first (eigenvalue = 3.12) factor.

The most conspicuous sex differences occurred between the different domains of beliefs and the four factors. For women, the strongest associations ($p < .01$) occurred between the ego-alien intrusion factor and total beliefs (0.45), witchcraft (0.43), spiritualism (0.41), and precognition (0.37). The pattern was quite different for men. Only the sensory enhancement Factor 1 was significantly correlated ($r = .43$) with total beliefs. Marginally significant correlations were noted between this factor and beliefs in spiritualism (0.39) and extraterrestrial life forms (0.38). Neither men nor women displayed significant correlations between any of the Paranormal Belief subscales and either Factor 2 or Factor 4.

These results suggest that paranormal beliefs of men and women are mediated by different components of temporal lobe lability. For women these beliefs are most strongly associated with experiences of ego-alien intrusions, such as a sensed presence. Reanalysis of experimental data (Ruttan, Persinger, & Koren, 1990) has indicated that normal women reported significantly ($p < .01$) more of these experiences (44%) than did men (23%) when patterns of weak magnetic fields were generated across the temporal lobes while the subjects were relaxing within a partial sensory-deprived setting. The results are compatible with the more intense right hemispheric indicators of people who display greater numbers of temporal lobe signs (Richards & Persinger, 1991).

This gender-enhanced experience is compatible with the more frequent coherence of electrical activity between the cerebral hemispheres of women's brains compared to men's brains (Corsi-Cabrera, Herrera, & Malvido, 1989). As discussed by Persinger and Makarec (1991a, 1991b), this coherence

should allow more frequent access to the neurocognitive processes that are the homologues of the left hemispheric operations that generate the sense of self in the normal brain. These right hemispheric equivalents are postulated to be the source of the experience of ego-alien intrusions, i.e., the sensed presence. The results of the present study suggest that these common experiences may also affect the specific types of paranormal beliefs.

University men embrace paranormal and religious beliefs with less enthusiasm and exhibit a different pattern of association between temporal lobe signs and the Paranormal Belief subscales. A sensory-enhancement, not an ego-alien intrusion, factor was more important. The correlation between this factor and beliefs in spiritualism and extraterrestrial life forms suggests that exacerbation of normal phenomenological states encourages beliefs in more externalised forces that do not directly impinge upon the person's sense of self.

Direct comparisons between the sample from a northern Ontario university and the sample from a Louisiana university indicated that the students in this study reported less intense total paranormal beliefs ($F_{1,114} = 11.04$, $p < .001$), traditional religious beliefs ($F = 30.12$, $p < .001$), and endorsement of witchcraft ($F = 7.74$, $p < .001$). There were no significant group differences for any of the other subscales. Subsequent comparisons for other populations in North America would be helpful in determining the ostensible effects of sociological events, such as devil and witchcraft epidemics (Stevens, 1990), upon beliefs.

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